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Abstract: The knowledge of the mosquito distribution in the Western Palaearctic region has significantly improved in recent decades. We here synthesise published records in an updated distribution chart. The western Palaearctic region is divided into 5 areas and 75 geographical units, the latter mainly considered on a country basis or on a geographical basis (e.g. islands). The total number of species accounts for 145. The status of each species for a defined geographic unit is given according to five categories: 'Present native', 'Present introduced', 'Uncertain for presence or absence', 'Absent extinct' and 'Absent never observed'. Relevant references are given per country in the annex.
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Introduction

The international projects MediLabSecure[1] and VectorNet[2] promote mosquito surveillance activities, including training and capacity building in EU Member States and Mediterranean riparian countries.

The MediLabSecure project aims to consolidate a laboratory network for surveillance and training on viruses that are pathogenic to humans and/or animals. It includes countries of the Mediterranean and Black Sea regions that have common sea borders and, as a result, share common public health issues and threats. Within the framework of this project, the medical entomology group produced MosKeyTool version 2[3], a freely available interactive identification key for mosquito species (larvae and females) distributed in the Euro-Mediterranean-Middle East region. It provides the current knowledge for the identification of the 131 mosquito species encountered in the area and can be used by experts as well as non-expert entomologists.

VectorNet is a "European network for sharing data on the geographic distribution of arthropod vectors, transmitting human and animal disease agents" launched by the European Centre for Disease Prevention and Contol (ECDC) and the European Food Safety Authority (EFSA). The network of medical entomologists and public health professionals, already established during the former VBORNET project (2009-2013), was extended to include veterinary entomologists and veterinarians working in the field of vectors and/or vector-borne diseases in Europe and countries surrounding the Mediterranean Basin (2014-2018).

As a result and a step in the capacity building process for the territories these projects focus on, we here provide an updated distribution chart of the Euro-Mediterranean mosquito species.

Materials and Methods

A previous chart for European mosquitoes (Snow & Ramsdale, 1999) served as a basis and was supplemented by data published since 1999 and by including additional countries and additional taxa. Taxa are considered as valid species or subspecies according to the Systematic Catalog of Culicidae (Gaffigan et al., 2017). In addition, the Mosquito Taxonomic Inventory[4] and the Catalogue of Palaearctic Diptera (Minař, 1990) were taken into consideration.

Distribution data have been extracted from scientific articles and grey literature collected by reference tracking and/or thanks to expert sharing. Authors' opinions were not considered except in excluding four papers that provide strongly implausible identifications which discredit the whole paper (Benmalek et al., 2018; Dahchar et al., 2017; Houmani et al., 2017; Möhlmann et al., 2017). The literature search focussed on the distribution of mosquito species with special emphasis on fauna checklists and references since 1999 (or earlier ones not listed in Snow & Ramsdale, 1999). Data searches were perfomed for all countries and territories belonging to the western Palaearctic region, i.e. Europe including its outermost regions of the eastern Atlantic Ocean, up to the Ural Mountains in the east; Northern Africa up to Central Sahara in the south; Near East countries belonging to the western Palaearctic region. Geographical units are considered on a country basis (e.g. Algeria, Finland, Malta, Switzerland) or on a geographical basis (e.g. Corsica, Crimean Peninsula, Cyprus,

[1] http://www.medilabsecure.com
[2] https://ecdc.europa.eu/en/about-us/partnerships-and-networks/disease-and-laboratory-networks/vector-net
[3] http://medilabsecure.com/moskeytool.html
[4] http://mosquito-taxonomic-inventory.info

Madeira, Russian southern districts). The total number of units reaches 75 (Table 1 and Figure 1). The resulting list of references from which distribution data have been extracted is presented thereafter by country or territory of the western Palaearctic region. The distribution maps per species may be observed on MosKeyTool version 2.1.

Table 1: List of the 75 geographical units of the western Palaearctic region, ordered according to five areas as in the charts (Tables 2-5), with codes given in Figure 1.

Area	Unit	ISO alpha-3 code	Other code	Remark
Western and Central Europe	Albania	ALB		
	Austria	AUS		
	Belgium	BEL		
	Bosnia & Herzegovina	BIH		
	Bulgaria	BGR		
	Croatia	HRV		
	Cyprus Island	CYP		
	Czech Republic	CZE		
	Denmark	DNK		Faroe Islands excluded
	Faroe Islands	FRO		
	France (continental)	FRA		Corsica excluded
	Corsica		COR	
	Germany	DEU		
	Greece	GRC		Aegean islands included, Crete excluded
	Crete		CRE	
	Hungary	HUN		
	Ireland (Republic of)	IRL		Northern Ireland excluded
	Italy (continental)	ITA		Sardinia and Sicily excluded
	Sardinia		SAR	
	Sicily		SIC	
	Kosovo		KOS	
	Liechtenstein	LIE		
	Luxembourg	LUX		
	Former Yugoslav Republic of Macedonia	MKD		
	Malta	MLT		
	Montenegro	MNE		
	Netherlands	NLD		
	Poland	POL		
	Portugal (continental)	PRT		Madeira and Azores excluded
	Azores		AZO	
	Madeira		MAA	
	Romania	ROU		
	Slovakia	SVK		
	Slovenia	SVN		
	Serbia	SRB		
	Spain (continental)	ESP		Balearic and Canary islands excluded
	Balearic Islands		BAL	
	Canary Islands		CAA	
	Switzerland	CHE		
	Turkey (Thrace Region)		TUR-TH	Anatolia excluded
	United Kingdom	GBR		Shetland excluded; Channel, Man and Orkney islands and Northern Ireland included

	Shetland		SHE	
Eastern Europe	Belarus	BLR		
	Moldova	MDA		
	Russia Central		RUS-CN	Central federal district
	Russia Volga		RUS-VO	Volga federal district
	Russia southern districts		RUS-SD	South and North Caucasus federal districts
	Ukraine	UKR		Crimean Peninsula excluded
	Crimean Peninsula		CRP	
Northern Europe	Estonia	EST		
	Finland	FIN		Åland included
	Iceland	ISL		
	Latvia	LVA		
	Lithuania	LTU		
	Norway	NOR		
	Svalbard		SVA	Jan Mayen included
	Russia Kaliningrad		RUS-KA	Kaliningrad Oblast
	Russia north-western		RUS-NW	North-western federal district
	Sweden	SWE		
Caucasus and Middle-East	Armenia	ARM		
	Azerbaijan	AZE		
	Georgia	GEO		
	Iraq	IRQ		
	Israel	ISR		
	Jordan	JOR		
	Kuwait	KWT		
	Lebanon	LBN		
	Palestine	PSE		Palestinian territories
	Syria	SYR		Syrian Arab Republic
	Turkey (Anatolia)		TUR-AN	Thrace Region excluded
North Africa	Algeria	DZA		
	Egypt	EGY		
	Libya	LBY		
	Morocco	MAR		Occidental Sahara excluded
	Tunisia	TUN		

Results & Discussion

Mosquito distribution data are given in Tables 2 to 5. The organisation of the species list matches the Systematic Catalog of Culicidae (Gaffigan et al., 2017). For the tribe Aedini, it also meets the systematic classification suggested by Wilkerson et al. (2015) and Wilkerson & Linton (2015) as for the subgenus *Rusticoidus*.

Five categories of distribution status are applied irrespective of abundance:

1) Present and autochthonous, including when spreading to neighbouring regions, labelled 'native' and highlighted by grey cells;

2) Present but exotic to the western Palaearctic, because introduced and then established (e.g. *Ae. albopictus* in Spain), labelled as 'introd' and highlighted by red cells;

3) Uncertain for presence or absence, labelled as 'uncertain' and highlighted by blue cells; Uncertain for presence means (i) with only a single or few records and impossible to verify, or (ii) introduced out of its natural distribution area and without confirmation of establishment (e.g. *Ae. albopictus* in Belgium, Czech Republic, Slovakia, United Kingdom); Uncertain for absence means previously present and probably extinct today;

4) Absent and extinct (previously present and certainly extinct today; e.g. *Ae. aegypti* in France), labelled as 'extinct' and highlighted by white cells;

5) Absent and/or never observed, shown by empty cells.

Table 2: Chart of mosquito species distribution in the western Palaearctic region (western Europe)

				Western Europe																			Total geographical units:19				
				BEL	DNK	FRO	FRA	COR	DEU	IRL	LIE	LUX	NLD	PRT	AZO	MAA	ESP	BAL	CAA	CHE	GBR	SHE					
Genus	species	Subgenus	Authority	Belgium	Denmark	Faroe Islands	France (continental)	Corsica	Germany	Ireland	Liechtenstein	Luxembourg	Netherlands	Portugal	Azores	Madeira	Spain (continental)	Balearic Islands	Canary Islands	Switzerland	United Kingdom	Shetland	native	introd	uncertain	extinct	absent
Anopheles	*algeriensis*	*Anopheles*	Theobald, 1903				native	native	native	native			native	native			native	native			native		9	0	0	0	10
Anopheles	*cinereus* s.l.	*Cellia*	Theobald, 1901											native		native	native						3	0	0	0	16
Anopheles	*claviger* s.s.	*Anopheles*	(Meigen, 1804)	native	native		native	native	native	native	native	native	native	native			native	extinct		native	native		13	0	0	1	5
Anopheles	*hyrcanus*	*Anopheles*	(Pallas, 1771)				native	native									native						3	0	0	0	16
Anopheles	*maculipennis* s.l.	*Anopheles*	Meigen, 1818	native	native		native	native	native	native	native	native	native	native	native		native	native		native	native		15	0	0	0	4
Anopheles	*atroparvus*	*Anopheles*	van Thiel, 1927	native	native		native	native	native				native	native			native				native		9	0	0	0	10
Anopheles	*daciae*	*Anopheles*	Linton, Nicolescu & Harbach, 2004				native		native												native		3	0	0	0	16
Anopheles	*labranchiae*	*Anopheles*	Falleroni, 1926					native									uncertain						1	0	1	0	17
Anopheles	*maculipennis* s.s.	*Anopheles*	Meigen, 1818	native	native		native		native				native	native			native						7	0	0	0	12
Anopheles	*melanoon*	*Anopheles*	Hackett, 1934				native	native					native	native			native						5	0	0	0	14
Anopheles	*messeae*	*Anopheles*	Falleroni, 1926	native	native		native		native				native								native		6	0	0	0	13
Anopheles	*sacharovi*	*Anopheles*	Favre, 1903					uncertain															0	0	1	0	18
Anopheles	*marteri*	*Anopheles*	Senevet & Prunnelle, 1927					native									native						2	0	0	0	17
Anopheles	*multicolor*	*Cellia*	Cambouliu, 1902														native		native				2	0	0	0	17
Anopheles	*petragnani*	*Anopheles*	del Vecchio, 1939				native	native	introd					native			native	native					5	1	0	0	13
Anopheles	*plumbeus*	*Anopheles*	Stephens, 1828	native	native		native	native	native	native	native	native	native	native			native			native	native		13	0	0	0	6
Anopheles	*sergentii sergentii*	*Cellia*	(Theobald, 1907)														native		native				2	0	0	0	17
Anopheles	*superpictus*	*Cellia*	Grassi, 1899					native							native		uncertain						2	0	1	0	16
Aedes	*aegypti*	*Stegomyia*	(Linnaeus, 1762)				extinct	extinct						extinct	extinct	introd	extinct	extinct	uncertain				0	1	1	6	11
Aedes	*albopictus*	*Stegomyia*	(Skuse, 1894)	uncertain			introd	introd	introd				uncertain	uncertain			introd	introd		introd	uncertain		0	6	4	0	9
Aedes	*annulipes*	*Ochlerotatus*	(Meigen, 1830)	native	native		native		native			native	native							native	native		8	0	0	0	11
Aedes	*atropalpus*	*Georgecraigius*	(Coquillet, 1902)										extinct										0	0	0	1	18
Aedes	*berlandi*	*Ochlerotatus*	Séguy, 1921				native	native						native			native						4	0	0	0	15
Aedes	*cantans*	*Ochlerotatus*	(Meigen, 1818)	native	native		native	native	native	native		native	native				native			native	native		11	0	0	0	8
Aedes	*caspius* s.l.	*Ochlerotatus*	(Pallas, 1771)	native	native		native	native	native	native			native	native			native	native	native	native	native		13	0	0	0	6
Aedes	*cataphylla*	*Ochlerotatus*	Dyar, 1916		native		native		native								native			native			5	0	0	0	14
Aedes	*cinereus*	*Aedes*	Meigen, 1818	native	native		native	native	native	native		native	native							native	native		10	0	0	0	9
Aedes	*coluzzii*	*Ochlerotatus*	Rioux, Guilvard & Pasteur, 1998				native							native									2	0	0	0	17
Aedes	*communis*	*Ochlerotatus*	(De Geer, 1776)	native	native		native	native	native				native							native	uncertain		7	0	1	0	11
Aedes	*cyprius*	*Ochlerotatus*	Ludlow, 1920						uncertain														0	0	1	0	18
Aedes	*detritus*	*Ochlerotatus*	(Haliday, 1833)	native	native		native	native	native	native			native	native			native	extinct			native		10	0	0	1	8
Aedes	*diantaeus*	*Ochlerotatus*	(Howard, Dyar & Knab, 1912)		native		native		native														3	0	0	0	16
Aedes	*dorsalis*	*Ochlerotatus*	(Meigen, 1830)	native	native		native	native	native	native			native				extinct			native	native		9	0	0	1	9
Aedes	*eatoni*	uncertain	(Edwards, 1916)													native			native				2	0	0	0	17
Aedes	*echinus*	*Dahliana*	(Edwards, 1920)											native			native						2	0	0	0	17
Aedes	*excrucians* s.l.	*Ochlerotatus*	(Walker, 1856)		native				native				native							native			4	0	0	0	15
Aedes	*flavescens*	*Ochlerotatus*	(Müller, 1764)	native	native		native		native				native				native			native	native		8	0	0	0	11
Aedes	*geminus*	*Aedes*	Peus, 1970				native		native	native	native						native			native	native		7	0	0	0	12
Aedes	*geniculatus*	*Dahliana*	(Olivier, 1791)	native	native		native	native	native			native	native	native			native			native	native		11	0	0	0	8
Aedes	*gilcolladoi*	*Dahliana*	Sánchez-Covisa Villa, Rodríguez Rodríguez & Guillén Llera, 1985														native						1	0	0	0	18
Aedes	*intrudens*	*Ochlerotatus*	Dyar, 1919		native				native											uncertain			2	0	1	0	16
Aedes	*japonicus*	*Hulecoeteomyia*	(Theobald, 1901)	introd			introd		introd		introd	introd	introd				uncertain			introd			0	7	1	0	11
Aedes	*koreicus*	*Hulecoeteomyia*	(Edwards, 1917)	introd					introd											introd			0	3	0	0	16
Aedes	*leucomelas*	*Ochlerotatus*	(Meigen, 1804)		native				native				native				native				native		5	0	0	0	14
Aedes	*mariae*	*Acartomyia*	(Sergent & Sergent, 1903)				native	native						native			native	native					5	0	0	0	14
Aedes	*zammitii*	*Acartomyia*	(Theobald, 1903)																				0	0	0	0	19
Aedes	*nigrinus*	*Ochlerotatus*	(Eckstein, 1918)		native		native	native	native				native								native		6	0	0	0	13
Aedes	*pulcritarsis*	*Ochlerotatus*	(Rondani, 1872)				native	native						native			native	native					5	0	0	0	14
Aedes	*pullatus*	*Ochlerotatus*	(Coquillett, 1904)				native	native	native					native			native			native			6	0	0	0	13
Aedes	*punctor*	*Ochlerotatus*	(Kirby, 1837)	native	native		native		native	native		native	native	native			native			native	native		11	0	0	0	8
Aedes	*quasirusticus*	*Rusticoidus*	Torres Cañamares, 1951														native						1	0	0	0	18
Aedes	*refiki*	*Rusticoidus*	Medschid, 1928				native		native								native			native			4	0	0	0	15
Aedes	*riparius*	*Ochlerotatus*	Dyar & Knab, 1907						native				native							uncertain			2	0	1	0	16
Aedes	*rossicus*	*Aedes*	Dolbeshin, Gorickaja & Mitrofanova, 1930				native		native														2	0	0	0	17
Aedes	*rusticus*	*Rusticoidus*	(Rossi, 1790)	native	native		native	native	native	native		native	native	native			native			native	native		12	0	0	0	7
Aedes	*sticticus*	*Ochlerotatus*	(Meigen, 1838)	native	native		native		native			native	native				native			native	native		9	0	0	0	10
Aedes	*surcoufi*	*Ochlerotatus*	(Theobald, 1912)				native										native						2	0	0	0	17
Aedes	*vexans* s.l.	*Aedimorphus*	(Meigen, 1830)	native	native		native	native	native				native	native			native	native		native	native		11	0	0	0	8
Aedes	*vittatus*	*Fredwardsius*	(Bigot, 1861)				native	native						native			native	native					5	0	0	0	14

Genus	species	Subgenus	Authority	BEL Belgium	DNK Denmark	FRO Faroe Islands	FRA France (continental)	COR Corsica	DEU Germany	IRL Ireland	LIE Liechtenstein	LUX Luxembourg	NLD Netherlands	PRT Portugal	AZO Azores	MAA Madeira	ESP Spain (continental)	BAL Balearic Islands	CAA Canary Islands	CHE Switzerland	GBR United Kingdom	SHE Shetland	Total geographical units:19 native	introd	uncertain	extinct	absent
Culex	*arbieeni*	*Maillotia*	Salem, 1938														native		native				2	0	0	0	17
Culex	*brumpti*	*Culex*	Gaillard, 1931					native															1	0	0	0	18
Culex	*deserticola*	*Maillotia*	Kirkpatrick, 1925														native						1	0	0	0	18
Culex	*europaeus*	*Neoculex*	da Cunha Ramos, Ribeiro & Harrison, 2003											native			native						2	0	0	0	17
Culex	*hortensis* s.l.	*Maillotia*	Ficalbi, 1889	native			native	native	native		native			native		native	native	native	native	native			11	0	0	0	8
Culex	*impudicus*	*Neoculex*	Ficalbi, 1890				native	native						native			native						4	0	0	0	15
Culex	*laticinctus*	*Culex*	Edwards, 1913											native			native	native	native				4	0	0	0	15
Culex	*martinii*	*Neoculex*	Medschid, 1930				native	native	native											native			4	0	0	0	15
Culex	*mimeticus*	*Culex*	Noè, 1899				native	native						native			native						4	0	0	0	15
Culex	*modestus*	*Barraudius*	Ficalbi, 1890		native		native	native	native				native	native			native			native	native		9	0	0	0	10
Culex	*perexiguus*	*Culex*	Theobald, 1903											native			native						2	0	0	0	17
Culex	*pipiens*	*Culex*	Linnaeus, 1758	native	native		native	native	native	native	native	native	native	native	native	native	native	native	native	native	native		17	0	0	0	2
Culex	*territans*	*Neoculex*	Walker, 1856	native	native		native	native	native		native	native	native	native			native			native	native		12	0	0	0	7
Culex	*theileri*	*Culex*	Theobald, 1903				native	native						native		native	native		native	uncertain			6	0	1	0	12
Culex	*torrentium*	*Culex*	Martini, 1925	native	native		native	native	native	native	native	native	native	native			native			native	native	native	14	0	0	0	5
Culex	*univittatus*	*Culex*	Theobald, 1901											native			native						2	0	0	0	17
Culiseta	*alaskaensis* s.l.	*Culiseta*	(Ludlow, 1906)				native		native	native			native							native	native		6	0	0	0	13
Culiseta	*annulata*	*Culiseta*	(Schrank, 1776)	native	native		native	native	native	native		native	native	native			native	native		native	native		13	0	0	0	6
Culiseta	*atlantica*	*Culiseta*	(Edwards, 1932)												native								1	0	0	0	18
Culiseta	*bergrothi*	*Culiseta*	(Edwards, 1921)		native																		1	0	0	0	18
Culiseta	*fumipennis*	*Culicella*	(Stephens, 1825)	native	native		native	native	native				native	native			native			native	native		10	0	0	0	9
Culiseta	*glaphyroptera*	*Culiseta*	(Schiner, 1864)				native		native											uncertain			2	0	1	0	16
Culiseta	*litorea*	*Culicella*	(Shute, 1928)				native	native		native				native			native				native		6	0	0	0	13
Culiseta	*longiareolata*	*Allotheobaldia*	(Macquart, 1838)				native	native	native					native		native	native	native	native	native	uncertain		9	0	1	0	9
Culiseta	*morsitans*	*Culicella*	(Theobald, 1901)	native	native		native	native	native	native			native				native			native	native		10	0	0	0	9
Culiseta	*ochroptera*	*Culicella*	(Peus, 1935)						native				native										2	0	0	0	17
Culiseta	*subochrea*	*Culiseta*	(Edwards, 1921)	native	native		native	native	native	native			native	native			native				native		10	0	0	0	9
Coquillettidia	*buxtoni*	*Coquillettidia*	(Edwards, 1923)				native	native	native							native	native			native			6	0	0	0	13
Coquillettidia	*richiardii*	*Coquillettidia*	(Ficalbi, 1889)	native	native		native	native	native	native		native	native	native			native			native	native		12	0	0	0	7
Orthopodomyia	*pulcripalpis*	-	(Rondani, 1872)	native			native							native		native	native			uncertain	native		6	0	1	0	12
Uranotaenia	*unguiculata*	*Pseudoficalbia*	Edwards, 1913				native	native	native					native			native						5	0	0	0	14

species complex

		BEL	DNK	FRO	FRA	COR	DEU	IRL	LIE	LUX	NLD	PRT	AZO	MAA	ESP	BAL	CAA	CHE	GBR	SHE
Total	taxa	32	35	0	61	48	54	20	9	16	39	44	5	9	65	17	11	41	37	1
	species	31	34	0	60	47	53	19	8	15	38	43	4	9	64	16	11	40	36	1
	native	29	35	0	58	45	49	20	8	15	36	42	4	8	59	13	10	33	34	1
	introd	2	0	0	2	1	4	0	1	1	1	0	0	1	1	1	0	3	0	0
	uncertain	1	0	0	0	1	1	0	0	0	1	1	0	0	3	0	1	5	3	0
	extinct	0	0	0	1	1	0	0	0	0	1	1	1	0	2	3	0	0	0	0
	Total taxa	32	35	0	61	48	54	20	9	16	39	44	5	9	65	17	11	41	37	1

native	present, autochtonous
introd	present, introduced and established (e.g. *Ae. albopictus* in Spain)
uncertain	uncertain for presence or absence; for instance with single or few records impossible to verify, or introduced without confirmation of establishment (e.g. *Ae. albopictus* in UK), or previously present and probably extinct today
extinct	absent extinct (previously present and certainly extinct today; e.g. *Ae. aegypti* in France)
	absent, never observed, or only few sporadic records out of its natural distribution area

Table 3: Chart of mosquito species distribution in the western Palaearctic region (central Europe)

				Central Europe																					Total geographical units:22				
Genus	species	Subgenus	Authority	ALB Albania	AUS Austria	BIH Bosnia & Herzegovina	BGR Bulgaria	HRV Croatia	CZE Czech Rep.	GRC Greece	CRE Crete	HUN Hungary	ITA Italy (continental)	SAR Sardinia	SIC Sicily	KOS Kosovo	MKD FYRO Macedonia	MLT Malta	MNE Montenegro	POL Poland	ROU Romania	SVK Slovakia	SVN Slovenia	SRB Serbia	TUR-TH Turkey (Thrace Region)	native	introd	uncertain	extinct	absent
Anopheles	*algeriensis*	*Anopheles*	Theobald, 1903	native	native	native	native	native		native		native	native	native	native	native	uncertain		native		native	extinct			native	14	0	1	1	6
Anopheles	*cinereus* s.l.	*Cellia*	Theobald, 1901							native			native	native	native		native									5	0	0	0	17
Anopheles	*claviger* s.s.	*Anopheles*	(Meigen, 1804)	native	native	native	native	native	native	native	native	native	native	extinct	native		native		uncertain	native	native	native	native	native	native	18	0	1	1	2
Anopheles	*hyrcanus*	*Anopheles*	(Pallas, 1771)	native	native	native	native	native	native	native		native	native	native	native	native	native		uncertain		native	native		native	native	17	0	1	0	4
Anopheles	*maculipennis* s.l.	*Anopheles*	Meigen, 1818	native	native	native	native	native	native	native		native	native	native	native	native	native	native	native	native	native	native	native	native	native	21	0	0	0	1
Anopheles	*atroparvus*	*Anopheles*	van Thiel, 1927			native						native	native				native		native	native	native	native		native		9	0	0	0	13
Anopheles	*daciae*	*Anopheles*	Linton, Nicolescu & Harbach, 2004						native												native	native		native		4	0	0	0	18
Anopheles	*labranchiae*	*Anopheles*	Falleroni, 1926			native							native	native	native											4	0	0	0	18
Anopheles	*maculipennis* s.s.	*Anopheles*	Meigen, 1818	native		native			native	native		native	native		native		native		native	native	native	native	native	native	native	15	0	0	0	7
Anopheles	*melanoon*	*Anopheles*	Hackett, 1934	native		native				native			native	native			native				native					8	0	0	0	14
Anopheles	*messeae*	*Anopheles*	Falleroni, 1926	native		native			native	native		native	native				native		native	native	native	native	native	native	native	14	0	0	0	8
Anopheles	*sacharovi*	*Anopheles*	Favre, 1903	native	native	native	native	native		native			native	native			uncertain		native		uncertain				native	10	0	2	0	10
Anopheles	*marteri*	*Anopheles*	Senevet & Prunnelle, 1927	native			native			native				native	native											5	0	0	0	17
Anopheles	*petragnani*	*Anopheles*	del Vecchio, 1939										native	native	native											3	0	0	0	19
Anopheles	*plumbeus*	*Anopheles*	Stephens, 1828	native	native	native	native	native	native	native		native	native	native	native	native	uncertain		native	native	native	native	native	native	native	19	0	1	0	2
Anopheles	*sergentii sergentii*	*Cellia*	(Theobald, 1907)										native		native											2	0	0	0	20
Anopheles	*superpictus*	*Cellia*	Grassi, 1899	native		native	native			native			native		native		native		uncertain					native	native	9	0	1	0	12
Aedes	*aegypti*	*Stegomyia*	(Linnaeus, 1762)	extinct		extinct		extinct		extinct			extinct	extinct	extinct			extinct	extinct							0	0	0	9	13
Aedes	*albopictus*	*Stegomyia*	(Skuse, 1894)	introd	uncertain	introd	introd	introd	uncertain	introd	introd	uncertain	introd	introd	introd		introd	introd	introd		introd	uncertain	introd	uncertain	introd	0	15	5	0	2
Aedes	*annulipes*	*Ochlerotatus*	(Meigen, 1830)		native		native	native	native	native		native	native						uncertain	native	native	native	native	native	uncertain	12	0	2	0	8
Aedes	*atropalpus*	*Georgecraigius*	(Coquillett, 1902)										extinct													0	0	0	1	21
Aedes	*behningi*	*Ochlerotatus*	Martini, 1926																	native	uncertain	native				2	0	1	0	19
Aedes	*berlandi*	*Ochlerotatus*	Séguy, 1921							native			native	native	native	native										5	0	0	0	17
Aedes	*cantans*	*Ochlerotatus*	(Meigen, 1818)		native		native	native	native	native		native	native		native					native	native	native	native	native		13	0	0	0	9
Aedes	*caspius* s.l.	*Ochlerotatus*	(Pallas, 1771)	native	native	native	native	native	native	native		native	native	native	native	native	native	native	native	native	native	native	native	native	native	21	0	0	0	1
Aedes	*cataphylla*	*Ochlerotatus*	Dyar, 1916		native		native	native	native	native		native	native						uncertain	native	native	native		native	uncertain	11	0	2	0	9
Aedes	*cinereus*	*Aedes*	Meigen, 1818		native		native	native	native			native	native		uncertain		uncertain			native	native	native	native	native	native	12	0	2	0	8
Aedes	*communis*	*Ochlerotatus*	(De Geer, 1776)		native		native	native	native	native		native	native				native		uncertain	native	native	native		native	uncertain	12	0	2	0	8
Aedes	*cretinus*	*Stegomyia*	Edwards, 1921							native	native														native	3	0	0	0	19
Aedes	*cyprius*	*Ochlerotatus*	Ludlow, 1920																	native		native				2	0	0	0	20
Aedes	*detritus*	*Ochlerotatus*	(Haliday, 1833)	native			native			native		native	native	native	native		native	native	uncertain	native	native	native		native	native	14	0	1	0	7
Aedes	*diantaeus*	*Ochlerotatus*	(Howard, Dyar & Knab, 1912)						native											native		native				3	0	0	0	19
Aedes	*dorsalis*	*Ochlerotatus*	(Meigen, 1830)	native	native		native	native	native	native		native	native			native	native			native	native	native	native	native	uncertain	15	0	1	0	6
Aedes	*echinus*	*Dahliana*	(Edwards, 1920)	native			native			native			native	native	native				native						uncertain	7	0	1	0	14
Aedes	*euedes*	*Ochlerotatus*	Howard, Dyar & Knab, 1913																	native						1	0	0	0	21
Aedes	*excrucians* s.l.	*Ochlerotatus*	(Walker, 1856)		native		native	native	native			native								native	native	native	native	native		10	0	0	0	12
Aedes	*flavescens*	*Ochlerotatus*	(Müller, 1764)		native			native	native			native								native	native	native	native	native	uncertain	9	0	1	0	12
Aedes	*geminus*	*Aedes*	Peus, 1970									native	native							native	native	native				5	0	0	0	17
Aedes	*geniculatus*	*Dahliana*	(Olivier, 1791)	native	native		native	native	native	native		native	native	native	native		native		native	native	native	native	native	native	native	18	0	0	0	4
Aedes	*hexodontus*	*Ochlerotatus*	Dyar, 1916																	native						1	0	0	0	21
Aedes	*hungaricus*	*Ochlerotatus*	(Mihályi, 1955)		native							native									native	native				4	0	0	0	18
Aedes	*intrudens*	*Ochlerotatus*	Dyar, 1919		native				native											native	native	native		uncertain		5	0	1	0	16
Aedes	*japonicus*	*Hulecoeteomyia*	(Theobald, 1901)		introd			introd				introd	introd										introd			0	5	0	0	17
Aedes	*koreicus*	*Hulecoeteomyia*	(Edwards, 1917)									introd	introd										introd			0	3	0	0	19
Aedes	*lepidonotus*	*Rusticoidus*	(Edwards, 1920)							native							native								uncertain	2	0	1	0	19
Aedes	*leucomelas*	*Ochlerotatus*	(Meigen, 1804)		native	native		native	native			native								native	native	native				8	0	0	0	14
Aedes	*mariae*	*Acartomyia*	(Sergent & Sergent, 1903)							uncertain			native	native	native				uncertain							3	0	2	0	17
Aedes	*zammitii*	*Acartomyia*	(Theobald, 1903)	native				native		native			native		native			native	native		uncertain				native	8	0	1	0	13
Aedes	*nigrinus*	*Ochlerotatus*	(Eckstein, 1918)									native								native	uncertain	native				3	0	1	0	18
Aedes	*nigripes*	*Ochlerotatus*	(Zetterstedt, 1838)																	native						1	0	0	0	21
Aedes	*pionips*	*Ochlerotatus*	Dyar, 1919																native	native						2	0	0	0	20
Aedes	*pulcritarsis*	*Ochlerotatus*	(Rondani, 1872)	native			native	native	native	native		native	native		native	native			uncertain		native	native		native	native	13	0	1	0	8
Aedes	*pullatus*	*Ochlerotatus*	(Coquillett, 1904)		native	native	native		native	native		native	native						uncertain	native	native	native		native	uncertain	11	0	2	0	9
Aedes	*punctor*	*Ochlerotatus*	(Kirby, 1837)		native		native	native	native	native		native	native						native	native	native	native	native		uncertain	12	0	1	0	9
Aedes	*refiki*	*Rusticoidus*	Medschid, 1928			native			native	native		native	native								native	native	native	uncertain	uncertain	8	0	2	0	12
Aedes	*riparius*	*Ochlerotatus*	Dyar & Knab, 1907				native	native	native											native	native					5	0	0	0	17
Aedes	*rossicus*	*Aedes*	Dolbeshin, Gorickaja & Mitrofanova, 1930		native			native	native			native								native	uncertain	native		native		7	0	1	0	14
Aedes	*rusticus*	*Rusticoidus*	(Rossi, 1790)	native	native		native	native	native	native		native	native	native	native		native		native	native		native		native	native	16	0	0	0	6
Aedes	*sticticus*	*Ochlerotatus*	(Meigen, 1838)	native	native	native	native	native	native			native	native			native	native		native	native	native	native	native	native		16	0	0	0	6
Aedes	*subdiversus*	*Rusticoidus*	Martini, 1926														native							uncertain		1	0	1	0	20
Aedes	*surcoufi*	*Ochlerotatus*	(Theobald, 1912)									native	native													2	0	0	0	20
Aedes	*vexans* s.l.	*Aedimorphus*	(Meigen, 1830)	native	native	native	native	native	native	native		native	native	native	native	native	native		native	native	native	native	native	native	native	20	0	0	0	2
Aedes	*vittatus*	*Fredwardsius*	(Bigot, 1861)										native	native												2	0	0	0	20

Genus	species	Subgenus	Authority	ALB Albania	AUS Austria	BIH Bosnia & Herzegovina	BGR Bulgaria	HRV Croatia	CZE Czech Rep.	GRC Greece	CRE Crete	HUN Hungary	ITA Italy (continental)	SAR Sardinia	SIC Sicily	KOS Kosovo	MKD FYRO Macedonia	MLT Malta	MNE Montenegro	POL Poland	ROU Romania	SVK Slovakia	SVN Slovenia	SRB Serbia	TUR-TH Turkey (Thrace Region)	Total geographical units:22 native	introd	uncertain	extinct	absent
Culex	*hortensis* s.l.	*Maillotia*	Ficalbi, 1889	native	native	native	native		native	native		native	native	native	native	native	native	native	uncertain	native	native	native	native	native	native	19	0	1	0	2
Culex	*impudicus*	*Neoculex*	Ficalbi, 1890	native						native			native	native	native						uncertain				uncertain	5	0	2	0	15
Culex	*laticinctus*	*Culex*	Edwards, 1913	native				native		native			native	native	native			native			native				uncertain	8	0	1	0	13
Culex	*martinii*	*Neoculex*	Medschid, 1930		native	uncertain		native	native	native		native	native								native	native			uncertain	8	0	2	0	12
Culex	*mimeticus*	*Culex*	Noè, 1899	native			native			native		native	native	native	native	native	native		native		uncertain				uncertain	10	0	2	0	10
Culex	*modestus*	*Barraudius*	Ficalbi, 1890	native	native		native	native	native	native		native	native		native		native		native	native	native	native	native	native	native	17	0	0	0	5
Culex	*perexiguus*	*Culex*	Theobald, 1903	native			native			native			native		native		uncertain	native							native	7	0	1	0	14
Culex	*pipiens*	*Culex*	Linnaeus, 1758	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	22	0	0	0	0
Culex	*pusillus*	*Barraudius*	Macquart, 1850							native															uncertain	1	0	1	0	20
Culex	*territans*	*Neoculex*	Walker, 1856	native	native		native	native	native	native	native	native	native				native		uncertain	native	native	native	native	native	native	16	0	1	0	5
Culex	*theileri*	*Culex*	Theobald, 1903	native			native			native		native	native	native	native		native		uncertain		native	native			native	11	0	1	0	10
Culex	*torrentium*	*Culex*	Martini, 1925		native				native	native		native	native							native	native	native		native	uncertain	9	0	1	0	12
Culex	*tritaeniorhynchus*	*Culex*	Giles, 1901	native						native															native	3	0	0	0	19
Culiseta	*alaskaensis* s.l.	*Culiseta*	(Ludlow, 1906)		native				native			native								native	native	native	native			7	0	0	0	15
Culiseta	*annulata*	*Culiseta*	(Schrank, 1776)	native	native		native	native	native	native		native	native	native	native	native	native		native	native	native	native	native	native	native	19	0	0	0	3
Culiseta	*fumipennis*	*Culicella*	(Stephens, 1825)	native			native	native		native		native	native	native			native			native	native			native	uncertain	11	0	1	0	10
Culiseta	*glaphyroptera*	*Culiseta*	(Schiner, 1864)		native	native	native	native	native	native		native					native			native	native	native				11	0	0	0	11
Culiseta	*litorea*	*Culicella*	(Shute, 1928)	native									native	native	native											4	0	0	0	18
Culiseta	*longiareolata*	*Allotheobaldia*	(Macquart, 1838)	native			native			native	native	native	native	native	native	native	native	native	native		native	native	native	native	native	17	0	0	0	5
Culiseta	*morsitans*	*Culicella*	(Theobald, 1901)		native		native	native	native	native		native	native	native	native		native		uncertain	native	native	native	native	native	uncertain	15	0	2	0	5
Culiseta	*ochroptera*	*Culicella*	(Peus, 1935)						native			native								native	native	native				5	0	0	0	17
Culiseta	*subochrea*	*Culiseta*	(Edwards, 1921)					native	native	native	native	native	native	native	native					native	native	native		native	uncertain	12	0	1	0	9
Coquillettidia	*buxtoni*	*Coquillettidia*	(Edwards, 1923)			native	native	native		native			native	native	native	native			native		native				native	11	0	0	0	11
Coquillettidia	*richiardii*	*Coquillettidia*	(Ficalbi, 1889)	native	native		native	native	native	native		native	native	native	native		native		native	native	native	native	native	native	native	18	0	0	0	4
Orthopodomyia	*pulcripalpis*	-	(Rondani, 1872)	native			native	native		native		native	native				native		uncertain		native			native	uncertain	9	0	2	0	11
Uranotaenia	*unguiculata*	*Pseudoficalbia*	Edwards, 1913		native		native	native	native	native		native	native	native	native	native	native	native	native		native	native		native	native	17	0	0	0	5

species complex

Total	taxa	39	39	25	43	42	44	57	7	54	64	37	42	17	39	12	41	48	60	53	29	43	52		
	species	38	38	24	42	41	43	56	7	53	63	36	41	16	38	11	40	47	59	52	28	42	51		
	native	37	37	22	42	39	43	54	6	51	59	34	39	17	33	10	24	48	52	51	26	39	31		
	introd	1	1	1	1	2	0	1	1	2	3	1	1	0	1	1	1	0	1	0	3	0	1		
	uncertain	0	1	1	0	0	1	1	0	1	0	0	1	0	5	0	15	0	7	1	0	4	20		
	extinct	1	0	1	0	1	0	1	0	0	2	2	1	0	0	1	1	0	0	1	0	0	0		
	Total taxa	39	39	25	43	42	44	57	7	54	64	37	42	17	39	12	41	48	60	53	29	43	52		

native	present, autochtonous
introd	present, introduced and established (e.g. *Ae. albopictus* in Spain)
uncertain	uncertain for presence or absence; for instance with single or few records impossible to verify, or introduced without confirmation of establishment (e.g. *Ae. albopictus* in UK), or previously present and probably extinct today
extinct	absent extinct (previously present and certainly extinct today; e.g. *Ae. aegypti* in France)
	absent, never observed, or only few sporadic records out of its natural distribution area

Table 4: Chart of mosquito species distribution in the western Palaearctic region (eastern and northern Europe)

				Eastern Europe							Northern Europe										Total geographical units: 17				
				BLR	MDA	RUS-CN	RUS-VO	RUS-SD	UKR	CRP	EST	FIN	ISL	KAL	LVA	LTU	NOR	RUS-NW	SVA	SWE					
Genus	species	Subgenus	Authority	Belarus	Moldova	Russia Central	Russia Volga	Russia Southern districts	Ukraine	Crimean Peninsula	Estonia	Finland	Iceland	Kaliningrad Oblast	Latvia	Lithuania	Norway	Russia Northwestern	Svalbard	Sweden	native	introd	uncertain	extinct	absent
Anopheles	*algeriensis*	*Anopheles*	Theobald, 1903					native	native		native									native	4	0	0	0	13
Anopheles	*cinereus* s.l.	*Cellia*	Theobald, 1901						native												1	0	0	0	16
Anopheles	*claviger* s.s.	*Anopheles*	(Meigen, 1804)	native	native	native	native	native	native	native	native	native			native	native	native	native		native	14	0	0	0	3
Anopheles	*hyrcanus*	*Anopheles*	(Pallas, 1771)		native			native	native	native											4	0	0	0	13
Anopheles	*maculipennis* s.l.	*Anopheles*	Meigen, 1818	native	native	native	native	native	native	native	native	native		native	native	native	native	native		native	15	0	0	0	2
Anopheles	*atroparvus*	*Anopheles*	van Thiel, 1927	native	native			native	native	native					native					native	7	0	0	0	10
Anopheles	*beklemishevi*	*Anopheles*	Stegnii & Kabanova, 1976				native					native						native		native	4	0	0	0	13
Anopheles	*maculipennis* s.s.	*Anopheles*	Meigen, 1818		native	native	native	native	native	native		native			native	native	native	native		native	12	0	0	0	5
Anopheles	*melanoon*	*Anopheles*	Hackett, 1934		native			native													2	0	0	0	15
Anopheles	*messeae*	*Anopheles*	Falleroni, 1926	native	native	native	native	native	native	native		native			native	native	native	native		native	13	0	0	0	4
Anopheles	*sacharovi*	*Anopheles*	Favre, 1903		native			native		native											3	0	0	0	14
Anopheles	*plumbeus*	*Anopheles*	Stephens, 1828	native	native			native	native	native	native					native				native	8	0	0	0	9
Anopheles	*superpictus*	*Cellia*	Grassi, 1899					native													1	0	0	0	16
Aedes	*aegypti*	*Stegomyia*	(Linnaeus, 1762)					introd													0	1	0	0	16
Aedes	*albescens*	*Rusticoidus*	Edwards, 1921					native													1	0	0	0	16
Aedes	*albopictus*	*Stegomyia*	(Skuse, 1894)					introd													0	1	0	0	16
Aedes	*annulipes*	*Ochlerotatus*	(Meigen, 1830)	native	native					native	native	native		native	native	native		native		native	10	0	0	0	7
Aedes	*behningi*	*Ochlerotatus*	Martini, 1926	native	native	native	native	native	native					native		native		native			9	0	0	0	8
Aedes	*cantans*	*Ochlerotatus*	(Meigen, 1818)	native	native	native	native	native	native	native		native		native	native	native	native	native		native	14	0	0	0	3
Aedes	*caspius* s.l.	*Ochlerotatus*	(Pallas, 1771)	native	native	native	native	native	native	native	native	native			native	native	native	native		native	14	0	0	0	3
Aedes	*cataphylla*	*Ochlerotatus*	Dyar, 1916	native	native	native	native	native	native	native	native	native		native	native	native	native	native		native	15	0	0	0	2
Aedes	*cinereus*	*Aedes*	Meigen, 1818	native	native	native	native	native	native	native	native	native		native		native	native	native		native	14	0	0	0	3
Aedes	*communis*	*Ochlerotatus*	(De Geer, 1776)	native	native	native	native	native	native	native		native			native	native	native	native		native	13	0	0	0	4
Aedes	*cretinus*	*Stegomyia*	Edwards, 1921					uncertain													0	0	1	0	16
Aedes	*cyprius*	*Ochlerotatus*	Ludlow, 1920	native		native	native	native	native		native	native			native	native		native		native	11	0	0	0	6
Aedes	*detritus*	*Ochlerotatus*	(Haliday, 1833)	native		uncertain	uncertain										native	native		native	4	0	2	0	11
Aedes	*diantaeus*	*Ochlerotatus*	(Howard, Dyar & Knab, 1912)	native	native	native	native	native			native	native				native	native	native		native	11	0	0	0	6
Aedes	*dorsalis*	*Ochlerotatus*	(Meigen, 1830)	native	native	native	native	native	native	native		native			native	native	native	native		native	13	0	0	0	4
Aedes	*euedes*	*Ochlerotatus*	Howard, Dyar & Knab, 1913	native		native	native	native				native			native	native		native		native	9	0	0	0	8
Aedes	*excrucians* s.l.	*Ochlerotatus*	(Walker, 1856)	native	native	native	native	native	native	native	native	native		native	native	native	native	native		native	15	0	0	0	2
Aedes	*flavescens*	*Ochlerotatus*	(Müller, 1764)	native	native	native	native	native	native	native	native	native			native	native		native		native	13	0	0	0	4
Aedes	*geminus*	*Aedes*	Peus, 1970		native	native						native								native	4	0	0	0	13
Aedes	*geniculatus*	*Dahliana*	(Olivier, 1791)	native	native	native	native	native	native	native		native		native		native	native	native		native	13	0	0	0	4
Aedes	*hexodontus*	*Ochlerotatus*	Dyar, 1916	native								native					native	native		native	5	0	0	0	12
Aedes	*impiger*	*Ochlerotatus*	(Walker, 1848)									native					native	native		native	4	0	0	0	13
Aedes	*intermedius*	*Ochlerotatus*	Danilov & Gormostaeva, 1987				native														1	0	0	0	16
Aedes	*intrudens*	*Ochlerotatus*	Dyar, 1919	native		native	native				native	native		native	native	native	native	native		native	11	0	0	0	6
Aedes	*koreicus*	*Hulecoeteomyia*	(Edwards, 1917)					introd													0	1	0	0	16
Aedes	*krymmontanus*	*Rusticoidus*	Alekseev, 1989							native											1	0	0	0	16
Aedes	*leucomelas*	*Ochlerotatus*	(Meigen, 1804)	native	native	native	native	native	native		native	native			native	native	native	native		native	13	0	0	0	4
Aedes	*mercurator*	*Ochlerotatus*	Dyar, 1920															native			1	0	0	0	16
Aedes	*nigrinus*	*Ochlerotatus*	(Eckstein, 1918)									native				native	native	native		native	5	0	0	0	12
Aedes	*nigripes*	*Ochlerotatus*	(Zetterstedt, 1838)									native					native	native	native	native	5	0	0	0	12
Aedes	*pionips*	*Ochlerotatus*	Dyar, 1919	native		uncertain	uncertain					native					native	native		native	5	0	2	0	10
Aedes	*pulcritarsis*	*Ochlerotatus*	(Rondani, 1872)		native			native		native											3	0	0	0	14
Aedes	*pullatus*	*Ochlerotatus*	(Coquillett, 1904)	native		native	native	native				native				native	native	native		native	9	0	0	0	8
Aedes	*punctodes*	*Ochlerotatus*	Dyar, 1922									native					native			native	3	0	0	0	14
Aedes	*punctor*	*Ochlerotatus*	(Kirby, 1837)	native	native	native	native	native		native	native	native			native	native	native	native		native	13	0	0	0	4
Aedes	*refiki*	*Rusticoidus*	Medschid, 1928		uncertain					native										native	2	0	1	0	14
Aedes	*riparius*	*Ochlerotatus*	Dyar & Knab, 1907	native	native	native	native			native	native	native			native	native	native	native		native	12	0	0	0	5
Aedes	*rossicus*	*Aedes*	Dolbeshin, Gorickaja & Mitrofanova, 1930	native			native	native									native	uncertain		native	5	0	1	0	11
Aedes	*rusticus*	*Rusticoidus*	(Rossi, 1790)		uncertain					native	native			native	native	native		uncertain		native	6	0	2	0	9
Aedes	*sticticus*	*Ochlerotatus*	(Meigen, 1838)	native	native	native	native	native	native							native	native	native		native	10	0	0	0	7
Aedes	*stramineus*	*Ochlerotatus*	Dubitzky, 1970					native													1	0	0	0	16
Aedes	*subdiversus*	*Rusticoidus*	Martini, 1926				native	native													2	0	0	0	15
Aedes	*vexans* s.l.	*Aedimorphus*	(Meigen, 1830)	native	native	native	native	native	native	native	native	native		native	native	native	native	native		native	15	0	0	0	2

				Eastern Europe							Northern Europe									Total geographical units: 17				
				BLR	MDA	RUS-CN	RUS-VO	RUS-SD	UKR	CRP	EST	FIN	ISL	KAL	LVA	LTU	NOR	RUS-NW	SVA	SWE					
Genus	species	Subgenus	Authority	Belarus	Moldova	Russia Central	Russia Volga	Russia Southern districts	Ukraine	Crimean Peninsula	Estonia	Finland	Iceland	Kaliningrad Oblast	Latvia	Lithuania	Norway	Russia Northwestern	Svalbard	Sweden	native	introd	uncertain	extinct	absent
Culex	*hortensis* s.l.	*Maillotia*	Ficalbi, 1889					native		native											2	0	0	0	15
Culex	*martinii*	*Neoculex*	Medschid, 1930							native											1	0	0	0	16
Culex	*mimeticus*	*Culex*	Noè, 1899					native		native											2	0	0	0	15
Culex	*modestus*	*Barraudius*	Ficalbi, 1890	native	native	native	native	native	native	native								native		native	9	0	0	0	8
Culex	*pipiens*	*Culex*	Linnaeus, 1758	native	native	native	native	native	native	native	native	native		native	native	native	native	native		native	15	0	0	0	2
Culex	*territans*	*Neoculex*	Walker, 1856	native	native	native	native	native		native	native	native				native	native	native		native	12	0	0	0	5
Culex	*theileri*	*Culex*	Theobald, 1903		native			native		native											3	0	0	0	14
Culex	*torrentium*	*Culex*	Martini, 1925	native	native	native	native	native		native	native	native				native	native	native		native	12	0	0	0	5
Culiseta	*alaskaensis* s.l.	*Culiseta*	(Ludlow, 1906)	native	native	native	native		native	native	native	native		native	native	native	native	native		native	14	0	0	0	3
Culiseta	*annulata*	*Culiseta*	(Schrank, 1776)	native	native	native	native	native	native	native	native	native			native	native	native	native		native	14	0	0	0	3
Culiseta	*bergrothi*	*Culiseta*	(Edwards, 1921)			native	native					native					native	native		native	6	0	0	0	11
Culiseta	*fumipennis*	*Culicella*	(Stephens, 1825)	native		native	native	native	native	uncertain	native						native	native		native	9	0	1	0	7
Culiseta	*glaphyroptera*	*Culiseta*	(Schiner, 1864)						native											native	2	0	0	0	15
Culiseta	*longiareolata*	*Allotheobaldia*	(Macquart, 1838)		native			native	native	native											4	0	0	0	13
Culiseta	*morsitans*	*Culicella*	(Theobald, 1901)	native		native	native	native	native	native	native	native		native		native	native	native		native	13	0	0	0	4
Culiseta	*ochroptera*	*Culicella*	(Peus, 1935)	native		native	native		native		native	native		native		native		native		native	10	0	0	0	7
Culiseta	*subochrea*	*Culiseta*	(Edwards, 1921)				native	native				native					native			native	5	0	0	0	12
Coquillettidia	*buxtoni*	*Coquillettidia*	(Edwards, 1923)		native				native												2	0	0	0	15
Coquillettidia	*richiardii*	*Coquillettidia*	(Ficalbi, 1889)	native	native	native	native	native	native	native	native	native		native	native	native		native		native	14	0	0	0	3
Orthopodomyia	*pulcripalpis*	-	(Rondani, 1872)					native	native	native											3	0	0	0	14
Uranotaenia	*unguiculata*	*Pseudoficalbia*	Edwards, 1913		native			native	native	native											4	0	0	0	13

species complex

Total	taxa	40	41	38	42	53	36	41	27	41	0	16	25	36	37	46	1	52	
	species	39	40	37	41	52	35	40	26	40	0	15	24	35	36	45	1	51	
	native	40	39	36	40	49	36	40	27	41	0	16	25	36	37	44	1	52	
	introd	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
	uncertain	0	2	2	2	1	0	1	0	0	0	0	0	0	0	2	0	0	
	extinct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total taxa	40	41	38	42	53	36	41	27	41	0	16	25	36	37	46	1	52	

native	present, autochtonous
introd	present, introduced and established (e.g. *Ae. albopictus* in Spain)
uncertain	uncertain for presence or absence; for instance with single or few records impossible to verify, or introduced without confirmation of establishment (e.g. *Ae. albopictus* in UK), or previously present and probably extinct today
extinct	absent extinct (previously present and certainly extinct today; e.g. *Ae. aegypti* in France)
	absent, never observed, or only few sporadic records out of its natural distribution area

Table 5: Chart of mosquito species distribution in the western Palaearctic region (Caucasus, Middle East, North Africa)

				Caucasus			Middle-East									North Africa					Total geographical units: 17				
				ARM	AZE	GEO	CYP	IRQ	ISR	JOR	KWT	LBN	PSE	SYR	TUR-AN	DZA	EGY	LBY	MAR	TUN					
Genus	species	Subgenus	Authority	Armenia	Azerbaijan	Georgia	Cyprus Island	Iraq	Israel	Jordan	Kuwait	Lebanon	Palestine	Syria	Turkey (Anatolia)	Algeria	Egypt	Libya	Morocco	Tunisia	native	introd	uncertain	extinct	absent
Anopheles	*ainshamsi*	*Cellia*	Gad, Harbach & Harrison, 2006														native				1	0	0	0	16
Anopheles	*algeriensis*	*Anopheles*	Theobald, 1903			native	native	native	native	native		native		native	native	native	native	native	native	native	13	0	0	0	4
Anopheles	*apoci*	*Cellia*	Marsh, 1933					native													1	0	0	0	16
Anopheles	*arabiensis*	*Cellia*	Patton, 1905														native				1	0	0	0	16
Anopheles	*coluzzii*	*Cellia*	Coetzee and Wilkerson, 2013													uncertain					0	0	1	0	16
Anopheles	*cinereus* s.l.	*Cellia*	Theobald, 1901												uncertain	native	native	native	native	native	5	0	1	0	11
Anopheles	*claviger* s.s.	*Anopheles*	(Meigen, 1804)	native	native	native	native	native	native	native		native	native	native	native	native		native	native	native	15	0	0	0	2
Anopheles	*coustani*	*Anopheles*	Laveran, 1900						native	native							native		native	native	5	0	0	0	12
Anopheles	*dthali*	*Cellia*	Patton, 1905					native	native	native		native		native		native	native		native	native	9	0	0	0	8
Anopheles	*fluviatilis*	*Cellia*	James, 1902					native													1	0	0	0	16
Anopheles	*culicifacies*	*Cellia*	Giles, 1901					native													1	0	0	0	16
Anopheles	*hyrcanus*	*Anopheles*	(Pallas, 1771)	native	native	native	native	native		native		native		native	native			native	native		11	0	0	0	6
Anopheles	*maculipennis* s.l.	*Anopheles*	Meigen, 1818	native	native	native	native	native	native	native		native	native	native	native	native	native	native	native	native	16	0	0	0	1
Anopheles	*labranchiae*	*Anopheles*	Falleroni, 1926													native	native	native	native	native	5	0	0	0	12
Anopheles	*maculipennis* s.s.	*Anopheles*	Meigen, 1818	native	native	native		native							native						5	0	0	0	12
Anopheles	*melanoon*	*Anopheles*	Hackett, 1934		native	native		native							native						4	0	0	0	13
Anopheles	*messeae*	*Anopheles*	Falleroni, 1926												native						1	0	0	0	16
Anopheles	*persiensis*	*Anopheles*	Linton, Sedaghat & Harbach, 2003		native																1	0	0	0	16
Anopheles	*sacharovi*	*Anopheles*	Favre, 1903	native	native	native	native	native	native	native		native	native	native	native	native					12	0	0	0	5
Anopheles	*marteri*	*Anopheles*	Senevet & Prunnelle, 1927				native	native	native	native		native		native	native	native		native	native	native	11	0	0	0	6
Anopheles	*multicolor*	*Cellia*	Cambouliu, 1902				native	native	native	native						native	native	native	native	native	9	0	0	0	8
Anopheles	*petragnani*	*Anopheles*	del Vecchio, 1939													native			native	native	3	0	0	0	14
Anopheles	*pharoensis*	*Cellia*	Theobald, 1901						native	native				native			native	native			5	0	0	0	12
Anopheles	*plumbeus*	*Anopheles*	Stephens, 1828	native	native	native								native	native	native			native	native	8	0	0	0	9
Anopheles	*pulcherrimus*	*Cellia*	Theobald, 1902					native	native		native	native		native	native						6	0	0	0	11
Anopheles	*rhodesiensis rupicolus*	*Cellia*	Lewis, 1937							native		native				native	native		native		5	0	0	0	12
Anopheles	*rufipes broussesi*	*Cellia*	Edwards, 1929													native	native	native			3	0	0	0	14
Anopheles	*sergentii sergentii*	*Cellia*	(Theobald, 1907)					native	native	native						native	native	native	native	native	8	0	0	0	9
Anopheles	*stephensi*	*Cellia*	Liston, 1901					native			native										2	0	0	0	15
Anopheles	*superpictus*	*Cellia*	Grassi, 1899	native	native	native	native	native		native		native		native	native	native	native	native		native	13	0	0	0	4
Anopheles	*tenebrosus*	*Anopheles*	Dönitz, 1902						native	native							native	native			4	0	0	0	13
Anopheles	*turkhudi*	*Cellia*	Liston, 1901					native	native	native						native	native		native		6	0	0	0	11
Anopheles	*ziemanni*	*Anopheles*	Grünberg, 1902														native	native	native	native	4	0	0	0	13
Aedes	*aegypti*	*Stegomyia*	(Linnaeus, 1762)		extinct	introd	extinct	extinct	extinct	extinct		extinct	extinct	extinct	introd	extinct	introd	extinct	extinct	extinct	0	3	0	12	2
Aedes	*albineus*	*Ochlerotatus*	Séguy, 1923													native			native	native	3	0	0	0	14
Aedes	*albopictus*	*Stegomyia*	(Skuse, 1894)	introd		introd			introd	introd		introd	introd	introd	introd	introd			introd		0	10	0	0	7
Aedes	*annulipes*	*Ochlerotatus*	(Meigen, 1830)	native											native						2	0	0	0	15
Aedes	*berlandi*	*Ochlerotatus*	Séguy, 1921													native			native	native	3	0	0	0	14
Aedes	*biskraensis*	*Ochlerotatus*	Brunhes, 1999													native					1	0	0	0	16
Aedes	*caspius* s.l.	*Ochlerotatus*	(Pallas, 1771)	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	17	0	0	0	0
Aedes	*cataphylla*	*Ochlerotatus*	Dyar, 1916	native	native										native						3	0	0	0	14
Aedes	*cinereus*	*Aedes*	Meigen, 1818			native									native	native	native	native	native	native	7	0	0	0	10
Aedes	*coluzzii*	*Ochlerotatus*	Rioux, Guilvard & Pasteur, 1998													native			native	native	3	0	0	0	14
Aedes	*communis*	*Ochlerotatus*	(De Geer, 1776)												native						1	0	0	0	16
Aedes	*cretinus*	*Stegomyia*	Edwards, 1921			native	native					native			native						4	0	0	0	13
Aedes	*cyprius*	*Ochlerotatus*	Ludlow, 1920												native						1	0	0	0	16
Aedes	*detritus*	*Ochlerotatus*	(Haliday, 1833)				native		native						native	native	native	native	native	native	8	0	0	0	9
Aedes	*dorsalis*	*Ochlerotatus*	(Meigen, 1830)					native							native	native		native	native	native	6	0	0	0	11
Aedes	*dzeta*	*Ochlerotatus*	Seguy, 1924																uncertain		0	0	1	0	16
Aedes	*echinus*	*Dahliana*	(Edwards, 1920)												native	native			native	native	4	0	0	0	13
Aedes	*excrucians* s.l.	*Ochlerotatus*	(Walker, 1856)			native									native						2	0	0	0	15
Aedes	*flavescens*	*Ochlerotatus*	(Müller, 1764)	native											native				native		3	0	0	0	14
Aedes	*geniculatus*	*Dahliana*	(Olivier, 1791)	native	native	native			native			native			native	native			native	native	9	0	0	0	8
Aedes	*intrudens*	*Ochlerotatus*	Dyar, 1919			native															1	0	0	0	16
Aedes	*lepidonotus*	*Rusticoidus*	(Edwards, 1920)												native						1	0	0	0	16
Aedes	*leucomelas*	*Ochlerotatus*	(Meigen, 1804)												native						1	0	0	0	16
Aedes	*mariae*	*Acartomyia*	(Sergent & Sergent, 1903)													native		native	native	native	4	0	0	0	13
Aedes	*phoeniciae*	*Acartomyia*	Coluzzi & Sabatini, 1968				native		native			native		native	native						5	0	0	0	12
Aedes	*zammitii*	*Acartomyia*	(Theobald, 1903)												native			native		native	3	0	0	0	14
Aedes	*nigrocanus*	*Ochlerotatus*	Martini, 1927												native						1	0	0	0	16
Aedes	*pulcritarsis*	*Ochlerotatus*	(Rondani, 1872)		native	native			native			native			native	native			native	native	8	0	0	0	9
Aedes	*pullatus*	*Ochlerotatus*	(Coquillett, 1904)												native				native		2	0	0	0	15
Aedes	*punctor*	*Ochlerotatus*	(Kirby, 1837)	native		native									native	native					4	0	0	0	13

				Caucasus			Middle-East									North Africa					Total geographical units: 17				
				ARM	AZE	GEO	CYP	IRQ	ISR	JOR	KWT	LBN	PSE	SYR	TUR-AN	DZA	EGY	LBY	MAR	TUN					
Genus	species	Subgenus	Authority	Armenia	Azerbaijan	Georgia	Cyprus Island	Iraq	Israel	Jordan	Kuwait	Lebanon	Palestine	Syria	Turkey (Anatolia)	Algeria	Egypt	Libya	Morocco	Tunisia	native	introd	uncertain	extinct	absent
Aedes	*quasirusticus*	*Rusticoidus*	Torres Cañamares, 1951													native			native		2	0	0	0	15
Aedes	*refiki*	*Rusticoidus*	Medschid, 1928												native						1	0	0	0	16
Aedes	*rusticus*	*Rusticoidus*	(Rossi, 1790)												native	native			native		3	0	0	0	14
Aedes	*sticticus*	*Ochlerotatus*	(Meigen, 1838)			native															1	0	0	0	16
Aedes	*surcoufi*	*Ochlerotatus*	(Theobald, 1912)		native																1	0	0	0	16
Aedes	*versicolor*	uncertain	(Barraud, 1924)		native																1	0	0	0	16
Aedes	*vexans* s.l.	*Aedimorphus*	(Meigen, 1830)	native	native	native		native							native	native		native	native	native	9	0	0	0	8
Aedes	*vittatus*	*Fredwardsius*	(Bigot, 1861)													native			native	native	3	0	0	0	14
Culex	*adairi*	*Lasiosiphon*	Kirkpatrick, 1926						native								native				2	0	0	0	15
Culex	*antennatus*	*Culex*	(Becker, 1903)						native	native						native	native		native	native	6	0	0	0	11
Culex	*arbieeni*	*Maillotia*	Salem, 1938													native	native		native		3	0	0	0	14
Culex	*brumpti*	*Culex*	Gaillard, 1931													native			native		2	0	0	0	15
Culex	*deserticola*	*Maillotia*	Kirkpatrick, 1925					native	native	native				native	native	native	native	native	native	native	10	0	0	0	7
Culex	*duttoni*	*Culex*	Theobald, 1901																native		1	0	0	0	16
Culex	*hortensis* s.l.	*Maillotia*	Ficalbi, 1889	native	native	native	native	native	native			native			native	native			native	native	11	0	0	0	6
Culex	*impudicus*	*Neoculex*	Ficalbi, 1890				native								native	native			native	native	5	0	0	0	12
Culex	*judaicus*	*Neoculex*	Edwards, 1926						native	native		native									3	0	0	0	14
Culex	*laticinctus*	*Culex*	Edwards, 1913		native				native	native		native	native	native	native	native	native	native	native	native	12	0	0	0	5
Culex	*martinii*	*Neoculex*	Medschid, 1930	native			native		native			native			native		native		native		7	0	0	0	10
Culex	*mattinglyi*	*Culex*	Knight, 1953											native							1	0	0	0	16
Culex	*mimeticus*	*Culex*	Noè, 1899		native	native	native	native	native	native		native		native	native	native	native		native	native	13	0	0	0	4
Culex	*modestus*	*Barraudius*	Ficalbi, 1890		native	native		native	native						native	native			native		7	0	0	0	10
Culex	*perexiguus*	*Culex*	Theobald, 1903				native	native	native	native		native	native	native	native	native	native	native	native	native	13	0	0	0	4
Culex	*pipiens*	*Culex*	Linnaeus, 1758	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	17	0	0	0	0
Culex	*quinquefasciatus*	*Culex*	Say, 1823					native			native										2	0	0	0	15
Culex	*poicilipes*	*Oculeomyia*	(Theobald, 1903)						native								native				2	0	0	0	15
Culex	*pseudovishnui*	*Culex*	Colless, 1957					native													1	0	0	0	16
Culex	*pusillus*	*Barraudius*	Macquart, 1850					native	native	native	native			native	native	native	native	native	native	native	11	0	0	0	6
Culex	*simpsoni*	*Culex*	Theobald, 1905																native		1	0	0	0	16
Culex	*sinaiticus*	*Culex*	Kirkpatrick, 1924						native	native							native				3	0	0	0	14
Culex	*sitiens*	*Culex*	Wiedmann, 1828								native								native		2	0	0	0	15
Culex	*territans*	*Neoculex*	Walker, 1856	native	native	native		native	native	native					native	native			native	native	10	0	0	0	7
Culex	*thalassius*	*Culex*	Theobald, 1903											uncertain							0	0	1	0	16
Culex	*theileri*	*Culex*	Theobald, 1903	native	native	native	native	native	native	native	native	native		native	native	native	native	native	native	native	16	0	0	0	1
Culex	*torrentium*	*Culex*	Martini, 1925	native											native	native					3	0	0	0	14
Culex	*tritaeniorhynchus*	*Culex*	Giles, 1901		native	native		native	native	native	native	native		native	native		native				10	0	0	0	7
Culex	*univittatus*	*Culex*	Theobald, 1901						native		native	native		native			uncertain		uncertain	uncertain	4	0	3	0	10
Culex	*vagans*	*Culex*	Wiedemann, 1828						native								uncertain				1	0	1	0	15
Culiseta	*alaskaensis* s.l.	*Culiseta*	(Ludlow, 1906)	native		native									native						3	0	0	0	14
Culiseta	*annulata*	*Culiseta*	(Schrank, 1776)	native	native	native	native	native	native	native	native	native		native	native	native			native	native	14	0	0	0	3
Culiseta	*fumipennis*	*Culicella*	(Stephens, 1825)	native	native	native		native						native	native	native			native	native	9	0	0	0	8
Culiseta	*litorea*	*Culicella*	(Shute, 1928)													native			native		2	0	0	0	15
Culiseta	*longiareolata*	*Allotheobaldia*	(Macquart, 1838)	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	native	17	0	0	0	0
Culiseta	*morsitans*	*Culicella*	(Theobald, 1901)	native	native	native									native	native		native	native	native	8	0	0	0	9
Culiseta	*subochrea*	*Culiseta*	(Edwards, 1921)		native		native	native				native		native	native	native	native		native	native	10	0	0	0	7
Coquillettidia	*buxtoni*	*Coquillettidia*	(Edwards, 1923)						native					native	native	native			native		5	0	0	0	12
Coquillettidia	*richiardii*	*Coquillettidia*	(Ficalbi, 1889)	native	native									native	native	native			native		6	0	0	0	11
Orthopodomyia	*pulcripalpis*	-	(Rondani, 1872)		native							native			native	native		native	native	native	7	0	0	0	10
Uranotaenia	*balfouri*	*Uranotaenia*	Theobald, 1904													native			native		2	0	0	0	15
Uranotaenia	*mashonaensis*	*Pseudoficalbia*	Theobald, 1901						native												1	0	0	0	16
Uranotaenia	*unguiculata*	*Pseudoficalbia*	Edwards, 1913	native	native	native	native	native	native	native		native		native	native	native	native	native	native	native	15	0	0	0	2

species complex																			
Total	taxa		28	33	34	24	39	44	33	12	32	10	33	63	62	40	32	66	48
	species		27	32	33	23	38	43	32	12	31	9	32	62	61	39	31	65	47
		native	27	32	32	23	38	42	31	12	30	8	30	60	59	37	31	62	46
		introd	1	0	2	0	0	1	1	0	1	1	1	2	1	1	0	1	0
		uncertain	0	0	0	0	0	0	0	0	0	0	1	1	1	2	0	2	1
		extinct	0	1	0	1	1	1	1	0	1	1	1	0	1	0	1	1	1
	Total taxa		28	33	34	24	39	44	33	12	32	10	33	63	62	40	32	66	48

native	present, autochtonous
introd	present, introduced and established (e.g. *Ae. albopictus* in Spain)
uncertain	uncertain for presence or absence; for instance with single or few records impossible to verify, or introduced without confirmation of establishment (e.g. *Ae. albopictus* in UK), or previously present and probably extinct today
extinct	absent extinct (previously present and certainly extinct today; e.g. *Ae. aegypti* in France)
	absent, never observed, or only few sporadic records out of its natural distribution area

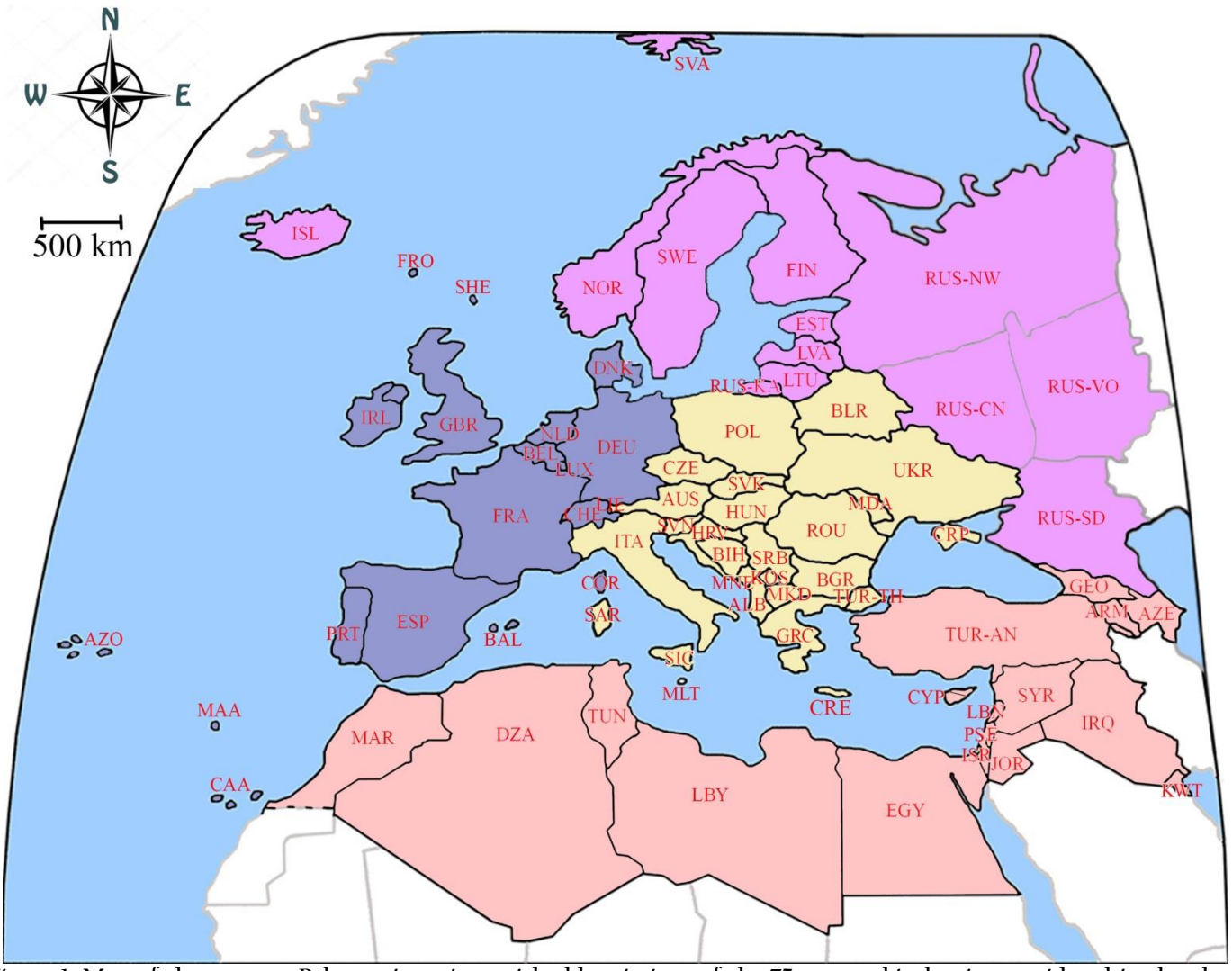

Figure 1: Map of the western Palaearctic region, with abbreviations of the 75 geographical units considered in the chart (Tables 2-5).

Comments regarding the species list

The number of taxa accounts for 147 (including one complex of species, *Anopheles maculipennis* s.l., and one extinct species, *Aedes atropalpus*) in the western Palaearctic region. In total, the number of species that are present in the region is 145. For a country/territory, only taxa with established populations are included, not those showing only sporadic introductions, with the exception of the invasive species *Ae. aegypti*, *Ae. albopictus* and *Ae. japonicus* for which introduction without confirmation of establishment is given in the category 'uncertain' (see above).

Developments of the distribution charts from Snow & Ramsdale, 1999 to the present one are provided in Table 6.

Table 6: Changes of the distribution charts from Snow & Ramsdale (1999) to the present one.

	Snow & Ramsdale, 1999	Present paper
Region	Europe	western Palaearctic
No. geographic units	43	75
No. mosquito species	96	145
No. references (text+annex)	5+272	41+331

- Genus *Anopheles*

- *Anopheles* (*Cellia*) *cinereus cinereus* Theobald, 1901 and *An. c. hispaniola* (Theobald, 1903) are very difficult if not impossible to separate morphologically and in the chart therefore considered together under the taxon *An. cinereus* s.l.; *An. c. hispaniola* is distributed mainly in the Mediterranean region and *An. c. cinereus* in tropical Africa.

- The *Anopheles* (*Cellia*) *gambiae* complex includes several major human malaria vectors and is mainly distributed in sub-Saharan Africa, but some populations have been reported from northern Africa. For instance *An. coluzzii* Coetzee and Wilkerson, 2013 was observed in Tinzaouatine, a village in Algeria near the Algeria-Mali border during a small malaria outbreak in 2007 (Boubidi et al., 2010) and *An. arabiensis* Patton, 1905 invaded Upper

Egypt from Sudan twice during 1942 and 1950 resulting in 180,000 malaria deaths (Kenawy, 1990).

- The *Anopheles* (*Anopheles*) *maculipennis* complex is represented by nine species in the western Palaearctic region, of which eight belong to the Maculipennis Subgroup (*An. atroparvus*, *An. daciae*, *An. labranchiae*, *An. maculipennis*, *An. melanoon*, *An. messeae*, *An. persiensis* and *An. sacharovi*), and one to the Quadrimaculatus Subgroup (*An. beklemishevi*) (Nicolescu et al., 2004). All species are listed separately in the chart, but because many old records are not reliable to a single species, they are also grouped under the name *An. maculipennis* s.l.
- The member of the *An. maculipennis* complex, *Anopheles (Anopheles) daciae* Linton, Nicolescu & Harbach, 2004 is included in the taxa list, despite growing scepticism regarding its taxonomic status (Kronefeld et al., 2014; Blažejová et al., 2017).
- *Anopheles* (*Anopheles*) *subalpinus* Hackett & Lewis, 1935, formerly recognised as a separate species of the *An. maculipennis* complex is now considered as a synonym of *An. melanoon* (Linton et al., 2002). All records previously referred to as *An. subalpinus* were changed to *An. melanoon* in the chart.
- *Anopheles* (*Anopheles*) *pseudopictus* Grassi, 1899 is now considered a synonym of *An. hyrcanus* (Moaoulis et al., 2018). Consequently, we list all previous *An. hyrcanus* and *An. pseudopictus* records from the western Palaearctic region under the name *An. hyrcanus* (Pallas, 1771).

- Genus *Aedes*

- *Aedes* (*Georgecraigius*) *atropalpus* (Coquillett, 1902) has been introduced into Italy, France, and The Netherlands and was established for some years in Italy and The Netherlands but was later eliminated (Medlock et al., 2015). This taxon is included in the chart although the species is no longer considered as a member of the western Palaearctic fauna.
- The complex *Aedes mariae* comprises three species: *Aedes* (*Acartomya*) *mariae* (Sergent & Sergent, 1903), *Ae.* (*Acy.*) *zammitii* (Theobald, 1903) and *Ae.* (*Acy.*) *phoeniciae* Coluzzi & Sabatini, 1968. The first species is distributed along coasts of the western Mediterranean, the second along coasts of the central Mediterranean, Adriatic and Aegean Seas, and the third along coasts of the eastern Mediterranean. The precise limits of these distributions in North Africa are not known. The species distribution was suggested to be contiguous but without overlap around the Mediterranean Sea (Coluzzi and Sabatini, 1968). The aquatic stages develop specifically in saline sea rock-pools. Because the three species are almost identical morphologically, old records may be considered with caution and new investigation might be performed based on recently developed molecular methods (Mastrantonio et al., 2015).
- *Aedes* (*Protomacleaya*) *triseriatus* (Say, 1823), a North American mosquito species has only once been reported in France in 2004. The interception occurred in a batch of used tyres originating from the U.S. and no establishment was confirmed (Medlock et al., 2012). This taxon is consequently not included in the chart.
- *Aedes* (*Hulecoeteomyia*) *japonicus* (Theobald, 1901) comprises four subspecies; to date, all populations reported from the western Palaearctic belong to *Ae. j. japonicus* and are listed as *Ae. japonicus* in the chart. This species was recorded in 2018 in Asturias, Spain (Eritja et al., In press).
- *Aedes* (*Ochlerotatus*) *beklemishevi* Denisova, 1955 is now considered a synonym of *Ae. (Och.) euedes* Howard, Dyar & Knab, 1913 (Wood, 1977).
- *Aedes* (*Ochlerotatus*) *caspius hargreavesi* Edwards, 1920, which has been described from Italy, is here included in the taxon *Ae. caspius* (Pallas, 1771) because of the scarcity of available information.
- *Aedes* (*Ochlerotatus*) *duplex* Martini, 1926 was described from two males collected in the European part of Russia. As no further record of any stage has since been made, these males are now considered aberrant specimens (Becker et al., 2010). Consequently, *Ae. duplex* is excluded from the chart.
- Because *Aedes* (*Ochlerotatus*) *dzeta* Seguy, 1924 is still listed as a valid species in the Systematic Catalog of Culicidae (Gaffigan et al., 2017), we include this taxon in the chart although it was only ever recorded as a larva found in Morocco during the first half of the 20th century. Recent publications related to mosquitoes in Morocco do not mention this species (Trari et al., 2017).
- The species *Aedes* (*Aedes*) *rossicus* Dolbeskin, Gorickaja & Mitrofanova, 1930 was previously considered a subspecies of *Ae.* (*Aed.*) *esoensis* Yamada, 1921 (Peus, 1972), but elevated to full species status by Becker et al., 2010. All records previously referred to as *Ae. e. rossicus* were changed to *Ae. rossicus*. *Aedes esoensis* is present in Russia, but not in its European part (Gutsevitch et al., 1971) and thus is not included in the chart.
- *Aedes (Aedimorphus) vexans* (Meigen, 1830) is listed here as a single taxon, although the existence of cryptic taxonomic units related to *Ae. vexans* is suggested in northern Europe (Lilja et al., 2018), and the subspecies *Ae. v. arabiensis* (Patton, 1905) has been reported from the Arabian Peninsula.

- Genus *Culex*

- *Culex* (*Maillotia*) *hortensis hortensis* Ficalbi, 1889 is widespread in the western Palaearctic region although the subspecies *Cx. h. maderensis* Mattingly, 1955 is reported as endemic from Madeira, but suspected to occur also in the Canaries (Schaffner et al., 2001) and in Albania (Rogozi et al., 2012). The two taxa are considered together under the name *Cx. hortensis* s.l. in the list.
- *Culex* (*Culex*) *univittatus* Theobald, 1901 has been confirmed to occur in the Iberian Peninsula (Mixão et al., 2016), demonstrating that *Culex* (*Culex*) *perexiguus* Theobald, 1903 is not the only species of the Univittatus subgroup occurring in Europe. Therefore records of *Cx. perexiguus* without detailed morphological examination or molecular identification may refer to *Cx. univittatus*.
- *Culex* (*Culex*) *juppi* Dumas et al., 2016 has been suggested as a cryptic species belonging to the *Cx. pipiens* complex that is associated with the absence of *Wolbachia* infection. This taxon does not fulfil the mandated requirements for availability and is considered a *nomen nudum*. Thus, the taxon is not included in the chart.
- The *Culex* (*Culex*) *pipiens* complex (sensu Sirivanakarn, 1976) in the Western Palaearctic region comprises two species. *Culex pipiens* L., 1758 is distributed over the whole region and *Cx. quinquefasciatus* Say, 1823, a tropical variant,

was only present in the most eastern side of the region (Iraq and Kuwait) until 2014. In addition, the latter was recorded from various areas around the Mediterranean Sea, including Turkey (Günay et al., 2015) and also as *pipiens/quinquefasciatus*-hybrids on the Greek island Kos (Shaikevich & Vinogradova, 2014) and in Morocco (Shaikevich et al., 2016). However, the establishment of *Cx. quinquefasciatus* populations in the western Palaearctic has not been demonstrated yet. The two taxa *Cx. pipiens* biotype *pipiens* Linnaeus, 1758 and *Cx. pipiens* biotype *molestus* Forskål, 1775 are grouped together under the name *Cx. pipiens* in the chart.

- *Culex* (*Culex*) *thalassius* Theobald, 1903 has only been reported from Syria (Abdel-Malek, 1960) with the status "doubtful" (Harbach, 1988) and, thus, is not included in the chart.

- Genus *Culiseta*
- The two taxa *Culiseta* (*Culiseta*) *alaskaensis alaskaensis* (Ludlow, 1906) and *Cs. a. indica* Edwards, 1920 are considered together under the name *Cs. alaskaensis* s.l. in the list. The two subspecies differ in general body coloration: dark in *Cs. a. alaskaensis* and light in *Cs. a. indica*. *Culiseta a. alaskaensis* is generally reported from the western Palaearctic region while *Cs. a. indica* is reported from Caucasus and Russia (Becker et al., 2010).

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